

Work Order	3353.5
Setup-Code	201214-10290-2801-01



Test Report

JIS Z 2801:2012 (Mod)

Antimicrobial products – Test for antimicrobial activity and efficacy

Test Object:

*Liquid Guard 2,9% versus
Staphylococcus aureus DSM21979 EDCC 5247
after 560 days of artificial ageing*

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Report on Findings

Client: Nano-Care Deutschland GmbH
Address: Alfred-Nobel-Straße 10
 66793 Saarwellingen

Work order no.: 3353.5

Test object: Liquid Guard 2,9% versus *Staphylococcus aureus* DSM21979
 EDCC 5247 after 560 days of artificial ageing

Sample description: coated foil

Date of receipt of sample: 11-Dec-2020

Type of test: JIS Z 2801:2012 Antimicrobial products – Test for antimicrobial activity
 and efficacy

Test Germ: *Staphylococcus aureus* DSM21979 EDCC 5247

Test laboratory: QualityLabs BT GmbH

Address: Neumeyerstrasse 46a
 90411 Nuremberg, Germany

Setup-Code: 201214-10290-2801-01

Sample material: coated foil

No. of pages in report: 7

Report on findings to the client: **Place and date of preparation:** Nuremberg, 17-Dec-2020
Recipient: Nano-Care Deutschland GmbH

Laboratory Director:

 Dr. Sabine Krause, Laboratory Manager
 QualityLabs BT GmbH

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Declaration on Quality Assurance

This investigation was performed and supervised according to the standard operating procedure "SOP zu JIS Z 2801:2012 (Mod)" by QualityLabs BT GmbH. The laboratory and process are continually monitored by independent, external authorities, as well as by internal audits.

Archiving

A copy of the test report, a protocol of the measurement as well as the accompanying correspondence and business records are archived by QualityLabs BT GmbH. The retention period is at least 10 years.

Test description

Anti-bacterial activity is determined in accordance with a modified version of JIS Z 2801:2012.

During the test, a thin liquid-film containing the bacteria (1.25×10^4 CFU / cm²) is applied directly to the test sample (Standard: 5 cm x 5 cm). To avoid desiccation a foil (Standard: 4cm x 4cm, Stomacher Bags) is applied. Immediately after inoculation, the bacteria from the reference sample are separated from the sample and the enveloping foil surfaces using ultrasound and vortex devices and the number of viable germs (CFU – colony-forming units) is determined (t_0 value). A further set of reference samples and samples given anti-microbial treatment is incubated with bacteria in a liquid-film and the enveloping foil in a damp environment at 37°C. After 24 hours, the bacteria are separated from the sample surfaces using ultrasound and vortex devices and the number of viable germs is determined (t_{24} value).

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Assessment of antimicrobial activity

A logarithmic germ reduction of **≥ 3 log scales** of the antimicrobial sample in comparison to the respective reference is used as assessment criterion to pass the antimicrobial test.

Germ reduktion [log scales]	Antibacterial activity
< 3	Not sufficient antimicrobial activity
≥ 3	Sufficient antimicrobial activity

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References to Testconditions

Testconditions		
Sample size	25	cm ²
Foil size	16	cm ²
Volume Inoculum	400	μl
Sample cleaning	70% Isopropanol	-

References to deviations, preincubations, special test conditions

560 days artificial ageing at 50°C corresponds to 10 years real time according to ASTM F 1980.

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Test Results

	Sample Name	Sample Code	t ₀ (cells/cm ²)			t ₂₄ (cells/cm ²)			Reduction [%]	Log Reduction
1	Nullprobe	1029011122000 76	8.7 x 10 ⁴	9.7 x 10 ⁴	9.4 x 10 ⁴	3.7 x 10 ⁵	3.5 x 10 ⁵	3.2 x 10 ⁵		Reference
2	Liquid Guard 2,9%	1029011122000 77				< 1.0 x 10 ¹	< 1.0 x 10 ¹	< 1.0 x 10 ¹	> 99.99	> 4

*see "Interpretation of Results", page 7

Test strain	<i>Staphylococcus aureus DSM21979 EDCC 5247</i>
Initial cell count inoculum / cm²	1.25 x 10 ⁴
Initials of the editor	CG
Measurement ended on	16-Dec-2020

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Comments on test objects

Samples were incubated at 50°C for 560 days.

Interpretation of the results based on the measurements

After 560 days of artificial ageing, the sample Liquid Guard 2.9% showed sufficient antibacterial efficacy against the test germ *Staphylococcus aureus* DSM21979 EDCC 5247.

Editor: Ms. Görgey _____

Crosschecked: Mr. Shendi _____

References

JIS Z 2801:2012 Antimicrobial products – Test for antimicrobial activity and efficacy